%%%% KLTBullPortfolioAdvisor
%%%% Source Code
%%%% May 2015 030354Z

%% main.m

```
%%initialize
    clear;
    clc;

%Variables - Risk Free Rate = 1.4%, as of Mar 31, 2015

    RiskFreeRate = .014;

%Introduction
    intro();

% Personal Info
    [age,gender,genderName,name]=getPersonalInformation();
    clc;

% Survey
    [ RiskAversion, highCapPreference ] = survey(gender,age);

% Fetch ticker data from Yahoo!
    FetchDataFromYahoo;

% Data Pre-Process
    dataPreprocessing;

% Optimization
    OptimizationUtility;

% Display Results
    DisplayResult;

% Visualization
    DrawFrontierFigure;
    DrawPieChart;
    DrawTrendLine(1200*Eret,1200*Ersk);

% Final Stage
    thankYou;
    clc;
    clear;

```

%% intro.m

```
function intro()
%INTRO Summary of this function goes here
%   Detailed explanation goes here
%Introduction
  fprintf('== Welcome =============================================== \n');
  fprintf('\n');
  fprintf(' 88   88  88   88888888    8888888  88    88 88     88     \n');
  fprintf(' 88  88   88       88        88    88 88    88 88     88     \n');
  fprintf(' 88888    88       88        8888888  88    88 88     88     \n');
  fprintf(' 88  88   88       88        88    88 88    88 88     88     \n');
  fprintf(' 88   88  88       88        88    88 88    88 88     88     \n');
  fprintf(' 88    88 8888888 88       88888888  888888  888888 888888 \n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' + Introduction\n');
  fprintf('\n');
  fprintf('    Our group project is an application that designs a\n');
  fprintf(' tailor-made portfolio based on your personal features.\n');
  fprintf(' We provide investment suggestions that will generate the\n');
  fprintf(' most PROFITs with the greatest SECURITY of your\n');
  fprintf(' wealth.\n');
  fprintf('\n');
  fprintf('\n');
  fprintf('\n');
  fprintf('\n');
  fprintf('\n');
  fprintf('Press any key to continue...');
  pause;
  clc;

%About
  fprintf('== About Us =============================================== \n');
  fprintf('\n');
  fprintf(' 88   88  88   88888888    8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88888    88      88       8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88   88  88      88       88    88 88    88 88     88      \n');
  fprintf(' 88    88 8888888 88       88888888  888888  888888 888888  \n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' + Our Members\n');
  fprintf('\n');
  fprintf('   Name               SID\n');
  fprintf('   ---------------------------\n');
  fprintf('   SHI Beiying        52637475\n');
  fprintf('   XU Yaohai          53546028\n');
  fprintf('   ZOU Luoyi          54017313\n');
  fprintf('   JIN Luteng         54018451\n');
  fprintf('   SHI Zhongjie       54018280\n');
  fprintf('\n');
  fprintf('Press any key to continue...');
  pause;
  clc;

%Hello
  fprintf('== Hello ================================================== \n');
  fprintf('\n');
  fprintf(' 88   88  88   88888888    8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88888    88      88       8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88   88  88      88       88    88 88    88 88     88      \n');
  fprintf(' 88    88 8888888 88       88888888  888888  888888 888888  \n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' - Hello, World!\n');
  fprintf('\n');
  fprintf('Press any key to continue...');
  pause;
  clc;

end

```

%% getPersonalInformation.m

```
function [age, genderCode,genderName,name]=getPersonalInformation()
%PERSONAL Summary of this function goes here
%   Detailed explanation goes here

%Default Value
age=0;
gender=8;

%Age
  fprintf('== Age ====================================================\n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' - Would you mind telling me your age?\n');
  fprintf('\n');
  age=input('# ');
  clc;

%Gender
  fprintf('== Gender =================================================\n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' - How can I call you?\n');
  fprintf('\n');
  fprintf('    1. Mr.\n');
  fprintf('    8. Ms.\n');
  fprintf('    9. Miss.\n');
  fprintf('    0. Mrs.\n');
  fprintf('\n');
  fprintf('Kindly enter 1, 8, 9 or 0.\n');
  fprintf('\n');
  genderCode=input('# ');
  gender='1';
      genderName='Mr.';

  if genderCode<5
    gender='1';
    else
    gender='8';
   end
   if genderCode==1
    genderName='Mr.';
   end
   if genderCode==8
    genderName='Ms.';
   end
   if genderCode==9
    genderName='Miss.';
   end
   if genderCode==0
    genderName='Mrs.';
   end
  clc;

%Name
  fprintf('== Gender =================================================\n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' - How can I call you?\n');
  fprintf('    ');
  name=input(strcat(genderName,' '),'s');
  clc;

end

```

%% survey.m

```
function [ RiskAversion, highCapPreference ] = survey(gender, age)
%SURVEY: Risk Aversion and Market Preference Survey
%   This function outputs user's risk rating and whether the user have
%   preference on asset liquidity.
%   rate: 1 to 10
%
%Survey Intro
  fprintf('== Risk Survey ============================================\n');
  fprintf('\n');
  fprintf(' 88   88  88   88888888    8888888  88    88 88      88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88      88      \n');
  fprintf(' 88888    88      88       8888888  88    88 88      88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88      88      \n');
  fprintf(' 88   88  88      88       88    88 88    88 88      88      \n');
  fprintf(' 88    88 8888888 88       88888888  888888  888888 888888\n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' Please take few minutes to answer the follow questions to \n');
  fprintf('help us optimize your portfolio.\n');
  fprintf('\n');
  fprintf('\n');
  fprintf('Press any key to continue...');
  pause;
  clc;


%Survey Q1
  fprintf('== Risk Survey #1 =========================================\n');
  fprintf('\n');
  fprintf(' 1.How many years of experience do you have in investment?\n');
  fprintf('\n');
  fprintf('    A. No Experience\n');
  fprintf('    B. < 3 years\n');
  fprintf('    C. 3 - 6 years\n');
  fprintf('    D. 7 - 10 years\n');
  fprintf('    E. >10 years\n');
  fprintf('\n');
  fprintf('\n');
  Q1=input('( A - E )$ ','s');
  clc;
  switch Q1
      case {'a','A'}
          r1=0;
      case {'b','B'}
          r1=2.5;
      case {'c','C'}
          r1=5;
      case {'d','D'}
          r1=7.5;
      case {'e','E'}
          r1=10;
      otherwise
          r1=5;
  end
clc;
%Survey Q2
  fprintf('== Risk Survey #2 =========================================\n');
  fprintf('\n');
  fprintf(' 2.How many types of investment products below are you \n');
  fprintf(' holding currently?\n');
  fprintf('\n');
  fprintf('    - Cash, deposits, certificate of deposits, capital \n');
  fprintf('     protected products\n');
  fprintf('    - Bonds, bond funds\n');
  fprintf('    - Foreign currencies, non capital protected currency \n');
  fprintf('     linked structured products\n');
  fprintf('    - Stocks, openend funds excluding bond funds & money \n');
  fprintf('     market funds, non capital protected equity linked \n');
  fprintf('     structured products, investmentlinked insurance plan,\n');
  fprintf('     commodities\n');
  fprintf('    - Options, futures, warrants\n');
  fprintf('\n');
  fprintf('\n');
  Q2=input('( 1 - 5 )# ','s');
  clc;
  switch Q2
      case {'0'}
          r2=0;
      case {'1'}
          r2=2;
      case {'2'}
          r2=4;
      case {'3'}
          r2=6;
      case {'4'}
          r2=8;
      case {'5'}
          r2=10;
      otherwise
          r2=5;
  end
clc;
%Survey Q3
  fprintf('== Risk Survey #3 =========================================\n');
  fprintf('\n');
  fprintf(' 3.In order to achieve your expected returns, which state- \n');
  fprintf('  ment best describes the degree of losses you are willing \n');
  fprintf('  to take?\n');
  fprintf('\n');
  fprintf('    A.I am willing to accept minimal amount of capital loss.\n');
  fprintf('    B.I am willing to accept moderate capital loss.\n');
  fprintf('    C.I am willing to accept high capital loss. \n');
  fprintf('\n');
  fprintf('\n');
  Q3=input('( A - C )$ ','s');
  clc;

  switch Q3
      case {'a','A'}
          r3=0;
      case {'b','B'}
          r3=5;
      case {'c','C'}
          r3=10;
      otherwise
          r3=5;
  end
  clc;
%Survey Q4
  fprintf('== Risk Survey #4 =========================================\n');
  fprintf('\n');
  fprintf(' 4.On the whole, which of the following best describes your\n');
  fprintf('  investment objective?\n');
  fprintf('\n');
  fprintf('    A.Capital Preservation\n');
  fprintf('    B.A Regular Steam Of Stable Income\n');
  fprintf('    C.A Combination Of Income And Capital Growth\n');
  fprintf('    D.Achieve Substantial Long Term Capital Growth\n');
  fprintf('    E.High Capital Appreciation\n');
  fprintf('\n');
  fprintf('\n');
  Q4=input('( A - E )$ ','s');
  clc;

  switch Q4
      case {'a','A'}
          r4=0;
      case {'b','B'}
          r4=2.5;
      case {'c','C'}
          r4=5;
      case {'d','D'}
          r4=7.5;
      case {'e','E'}
          r4=10;
      otherwise
          r4=5;
  end
  clc;

%Survey Q5
  fprintf('== Risk Survey #5 =========================================\n');
  fprintf('\n');
  fprintf(' 5.Which of the following portfolio is most attractive to\n');
  fprintf('  you?\n');
  fprintf('\n');
  fprintf('    A.Portfolio (a) - I am willing to accept a potential \n');
  fprintf('     loss of 3%% in exchange for 9%% potential upside.\n');
  fprintf('    B.Portfolio (b) - I am willing to accept a potential \n');
  fprintf('     loss of 10%% in exchange for 18%% potential upside.\n');
  fprintf('    C.Portfolio (c) - I am willing to accept a potential\n');
  fprintf('     loss of 15%% in exchange for 25%% potential upside.\n');
  fprintf('    D.Portfolio (d) - I am willing to accept a potential\n');
  fprintf('     loss of 20%% in exchange for 31%% potential upside.\n');
  fprintf('    E.Portfolio (e) - I am willing to accept a potential\n');
  fprintf('     loss of 27%% in exchange for 40%% potential upside.\n');
  fprintf('\n');
  fprintf('\n');
  Q5=input('( A - E )$ ','s');


  switch Q5
      case {'a','A'}
          r5=0;
      case {'b','B'}
          r5=2.5;
      case {'c','C'}
          r5=5;
      case {'d','D'}
          r5=7.5;
      case {'e','E'}
          r5=10;
      otherwise
          r5=5;
  end

  clc;
%Survey Q6
  fprintf('== Risk Survey #6 =========================================\n');
  fprintf('\n');
  fprintf(' 6.Compared to others, how do you rate your willingness to \n');
  fprintf('  take financial risks?\n');
  fprintf('\n');
  fprintf('    A. Extremely low risk taker.\n');
  fprintf('    B. Low risk taker.\n');
  fprintf('    C. Average risk taker.\n');
  fprintf('    D. High risk taker.\n');
  fprintf('    E. Extremely high risk taker.\n');
  fprintf('\n');
  fprintf('\n');
  Q6=input('( A - E )$ ','s');

  switch Q6
      case {'a','A'}
          r6=0;
      case {'b','B'}
          r6=2.5;
      case {'c','C'}
          r6=5;
      case {'d','D'}
          r6=7.5;
      case {'e','E'}
          r6=10;
      otherwise
          r6=5;
  end
  clc;

  rate=0.0+(r1+r2+r3+r4+r5)*0.08+r6*0.6;
  clc






% Market Cap Preference

  fprintf('== Liquidity Preference ===================================\n');
  fprintf('\n');
  fprintf(' Generally, stocks with high market capitalization have low\n');
  fprintf('  liquidity risk and low potential return, and vice versa.\n');
  fprintf('  In order to achieve your investment objectives, which of \n');
  fprintf('  the following statement best describes your style?\n');
  fprintf('\n');
  fprintf('    A.I prefer high potential return and high liquidity\n');
  fprintf('     risks. \n');
  fprintf('    B.I prefer low liquidity risk and low potential return. \n');
  fprintf('    C.I don''t have preference on stock''s market cap.\n');
  fprintf('\n');
  MCP=input('( A - C )$ ','s');


  switch MCP
      case {'a','A'}
          highCapPreference=-1;
      case {'b','B'}
          highCapPreference=1;
      case {'c','C'}
          highCapPreference=0;
      otherwise
          highCapPreference=0;
  end

  clc;

%highCapPreference



%Survey Result
  fprintf('== Risk Survey Result =====================================\n');
  fprintf('\n');
  fprintf('       YYY   YYY   0000000   UUU   UUU  RRRRRRR    \n');
  fprintf('        YYY YYY   000   000  UUU   UUU  RRR   RRR\n');
  fprintf('         YYYYY    000   000  UUU   UUU  RRR   RRR\n');
  fprintf('          YYY     000   000  UUU   UUU  RRRRRRR\n');
  fprintf('          YYY     000   000  UUU   UUU  RRR   RRR\n');
  fprintf('          YYY      0000000    UUUUUUU   RRR    RRR\n');
  fprintf('\n');
  fprintf('RRRRRR    EEEEEEEEE   SSSSSS    UUU   UUU  LLL    TTTTTTTTT\n');
  fprintf('RR    RR  EEE        SS    SSS  UUU   UUU  LLL       TTT\n');
  fprintf('RR    RR  EEEEEEEEE   SSSS      UUU   UUU  LLL       TTT\n');
  fprintf('RRRRRRR   EEE            SSSS   UUU   UUU  LLL       TTT\n');
  fprintf('RR    RR  EEE        SSS    SS  UUU   UUU  LLL       TTT\n');
  fprintf('RR     RR EEEEEEEEE    SSSSSS    UUUUUUU   LLLLLLLLL TTT\n');
  fprintf('\n');
  fprintf('Your risk tolerance rating is:%.1f\n',rate);
  fprintf('\n');
  fprintf('\n');
  fprintf('Press any key to continue...');
  pause;
  clc;

RiskAversion = 4.0 - rate / 5.0;

%Adjust gender difference
if(gender~=1)
    RiskAversion = 2+sqrt((RiskAversion-2)*2);
end

%Adjust age difference
RiskAversion = RiskAversion + 0.01 * age;

end

```

%% FetchDataFromYahoo.m

```
clc;

tickinperiod=0;

SamplePeriod='d';% y m w d
```

```
DateLength=90;

[ticker tickername]=getStockSet(highCapPreference);
% Fetch ticker data from Yahoo
for(i=1:length(ticker))
    try
        try
            data=fetch(yahoo,ticker(i),'Adj Close',now-DateLength,now,SamplePeriod);
            Stock(i).name=ticker(i);
            Stock(i).number=(ticker(i));
            Stock(i).price=flipud(data);%Now->Old => Old to Now.
            Stock(i).returns=price2ret(Stock(i).price(:,2),Stock(i).price(:,1))*22; %Daily Return Rate. convert to annual ~ returns*365
        catch %IF DON'T HAVE DATA FETCH TOOLBOX
            data=get_yahoo_stockdata2(ticker{i},now-DateLength,now,SamplePeriod,1);
            data=[datenum(data.Date) data.AdjClose];
            Stock(i).name=ticker(i);
            Stock(i).number=(ticker(i));
            Stock(i).price=data;
            Stock(i).returns=price2ret(Stock(i).price(:,2),Stock(i).price(:,1))*22; %Daily Return Rate. convert to annual ~ returns*365
      end
           %Progress Bar
            fetchProgress=(60*i/(1.0*length(ticker)));
            clc;
            fprintf('\n');
  fprintf('Downloading data from Yahoo!...\n');
  fprintf('\n');
  fprintf('\n');
  fprintf('  ');
            for(j=1:60)
                if(j<=fetchProgress)
                    fprintf('>');
                else
                    fprintf('-');
                end
            end

    if(length(Stock(i).price)>tickinperiod)
        tickinperiod=length(Stock(i).price);
    end

    catch

    end

end

% exclude the ticker that has stopped trading during the sample period.

```

%% getStockSet.m

```
function [result,tickername]=getStockSet(highCapPreference)

ticker=struct('number',0,'name','','sector','');
[tno,tnm,tsc,cap]  = importCSV('HKEquity.csv');

stockAmount=length(tno);

for(i=1:stockAmount)
ticker(i).number=tno(i);ticker(i).name=tnm(i);ticker(i).sector=tsc(i);ticker(i).cap=cap(i);
end

screenedTicker=[];

for(i=1:stockAmount)
    switch highCapPreference
```

```
        case -1
            if(ticker(i).cap<1E9)
               screenedTicker=[screenedTicker; ticker(i)];

            end
        case 1
            if(ticker(i).cap>=1E9)
               screenedTicker=[screenedTicker; ticker(i)];
            end
        otherwise
               screenedTicker=[screenedTicker; ticker(i)];
    end
end
ticker=screenedTicker;
stockAmount=length([ticker.cap]);
clc;

%
secCount=1;
secName(1)=ticker(1).sector;
secNum(1)=0;
for(i=1:stockAmount)

    if(strcmp(ticker(i).sector,secName(secCount))~=1)
        secCount=secCount+1;
        secName(secCount)=ticker(i).sector;
        secNum(secCount)=0;
    end
        secNum(secCount)=secNum(secCount)+1;
end
clc;

Number=[1:secCount]';
SectorName=secName';
StockCount=secNum';
sector=table(Number,SectorName,StockCount);


fin=0;
SelectedSectorNumber=[];clc

% Select Sector Number
while (fin==0)
fprintf('    <strong>Select Your Favorite Sector</strong>\n');
  fprintf('\n');
  fprintf('');
disp(sector);
display(SelectedSectorNumber);
i=input('Enter the number(1,2,etc...) before the sector name to select\n');
  fprintf('Press <strong>ENTER</strong> if finished. > ','s')
clc;
if(str2double(i)>=0)
    if(str2double(i)<=41)
        SelectedSectorNumber=[ SelectedSectorNumber str2num(i)];
    else
        fin=1;
    end
else
    fin=1;
end

clc;
end

SelectedSectorNumber=unique(SelectedSectorNumber);

SelectedTickerNo=[];


tickername={''};
%string TickerName;

```

```




for(i=1:stockAmount)
    for(j=1:length(SelectedSectorNumber))
        if (strcmp(ticker(i).sector,SectorName(SelectedSectorNumber(j))))
            SelectedTickerNo(length(SelectedTickerNo)+1)=ticker(i).number;
            tickername(length(SelectedTickerNo))=ticker(i).name;
        end
    end
end

SelectedTickerName=cell(length(SelectedTickerNo),1);

% Get Stock Name in Selected Industries.

for(i=1:length(SelectedTickerNo))
    SelectedTickerName(i)={strcat(num2str(SelectedTickerNo(i)),'.HK')};
    for(j=length(SelectedTickerName{i})+1:7)
        SelectedTickerName(i)=strcat('0',SelectedTickerName(i));
    end


end
    result=SelectedTickerName;

end

```

%% importCSV.m - Generated by MATLAB

```
function [Ticker,Name,Sector,Cap] = importCSV(filename, startRow, endRow)
%IMPORTFILE Import numeric data from a text file as column vectors.
%   [VARNAME1,CALC,AEROSPACEDEFENSE,VARNAME4,VARNAME5] =
%   IMPORTFILE(FILENAME) Reads data from text file FILENAME for the default
%   selection.
%
%   [VARNAME1,CALC,AEROSPACEDEFENSE,VARNAME4,VARNAME5] =
%   IMPORTFILE(FILENAME, STARTROW, ENDROW) Reads data from rows STARTROW
%   through ENDROW of text file FILENAME.
%
% Example:
%   [VarName1,CALC,AerospaceDefense,VarName4,VarName5] =
%   importfile('HKEquity.csv',1, 1820);
%
%    See also TEXTSCAN.

% Auto-generated by MATLAB on 2015/04/26 18:34:09

%% Initialize variables.
delimiter = ',';
if nargin<=2
    startRow = 1;
    endRow = inf;
end

%% Read columns of data as strings:
% For more information, see the TEXTSCAN documentation.
formatSpec = '%s%s%s%s%s%[^\n]');
  fprintf('\r]';

%% Open the text file.
fileID = fopen(filename,'r');

%% Read columns of data according to format string.
% This call is based on the structure of the file used to generate this
% code. If an error occurs for a different file, try regenerating the code
% from the Import Tool.
dataArray = textscan(fileID, formatSpec, endRow(1)-startRow(1)+1, 'Delimiter', delimiter, 'HeaderLines', startRow(1)-1, 'ReturnOnError', false);
for block=2:length(startRow)
```

```
    frewind(fileID);
    dataArrayBlock = textscan(fileID, formatSpec, endRow(block)-startRow(block)+1, 'Delimiter', delimiter, 'HeaderLines', startRow(block)-1, 'ReturnOnError', false);
    for col=1:length(dataArray)
        dataArray{col} = [dataArray{col};dataArrayBlock{col}];
    end
end

%% Close the text file.
fclose(fileID);

%% Convert the contents of columns containing numeric strings to numbers.
% Replace non-numeric strings with NaN.
raw = repmat({''},length(dataArray{1}),length(dataArray)-1);
for col=1:length(dataArray)-1
    raw(1:length(dataArray{col}),col) = dataArray{col};
end
numericData = NaN(size(dataArray{1},1),size(dataArray,2));

for col=[1,4]
    % Converts strings in the input cell array to numbers. Replaced non-numeric
    % strings with NaN.
    rawData = dataArray{col};
    for row=1:size(rawData, 1);
        % Create a regular expression to detect and remove non-numeric prefixes and
        % suffixes.
        regexstr = '(?<prefix>.*?)(?<numbers>([-]*(\d+[\,]*)+[\.]{0,1}\d*[eEdD]{0,1}[-+]*\d*[i]{0,1})|([-]*(\d+[\,]*)*[\.]{1,1}\d+[eEdD]{0,1}[-+]*\d*[i]{0,1}))(?<suffix>.*)';
        try
            result = regexp(rawData{row}, regexstr, 'names');
            numbers = result.numbers;

            % Detected commas in non-thousand locations.
            invalidThousandsSeparator = false;
            if any(numbers==',');
                thousandsRegExp = '^\d+?(\,\d{3})*\.{0,1}\d*$';
                if isempty(regexp(thousandsRegExp, ',', 'once'));
                    numbers = NaN;
                    invalidThousandsSeparator = true;
                end
            end
            % Convert numeric strings to numbers.
            if ~invalidThousandsSeparator;
                numbers = textscan(strrep(numbers, ',', ''), '%f');
                numericData(row, col) = numbers{1};
                raw{row, col} = numbers{1};
            end
        catch me
        end
    end
end


%% Split data into numeric and cell columns.
rawNumericColumns = raw(:, [1,4]);
rawCellColumns = raw(:, [2,3]);


%% Replace non-numeric cells with NaN
R = cellfun(@(x) ~isnumeric(x) && ~islogical(x),rawNumericColumns); % Find non-numeric cells
rawNumericColumns(R) = {NaN}; % Replace non-numeric cells

%% Allocate imported array to column variable names
Ticker = cell2mat(rawNumericColumns(:, 1));
Name = rawCellColumns(:, 1);
Sector = rawCellColumns(:, 2);
Cap = cell2mat(rawNumericColumns(:, 2));

```

%% dataPreprocessing.m

```
i=1;

    while(i<=length(Stock))
        if(length(Stock(i).price)<tickinperiod)
            Stock(i)=[];
            ticker(i)=[];
            tickername(i)=[];
            i=i-1;
        end
        i=i+1;
    end

for(i=1:length(ticker))
    Stock(i).MeanReturns=mean(Stock(i).returns);
    Stock(i).Variance=var(Stock(i).returns);
    Stock(i).StdDev=std(Stock(i).returns);

end
    Covariance=cov([Stock.returns]);
    Correlation=corrcoef([Stock.returns]);
clc;

```

%% OptimizationUtility.m

```
% Optimization Function

cret=(RiskFreeRate+1)^(1/12)-1; %Cash return
crsk=0; % cash risk=risk free
AssetList=[Stock.name];
p = Portfolio('AssetList', AssetList, 'RiskFreeRate', cret);
p = setAssetMoments(p, [Stock.MeanReturns], [Covariance]);

ExpReturn = [Stock.MeanReturns];

ExpCovariance  = [Covariance];

NumPorts = 80;

[PortRisk, PortReturn, PortWts] = portopt(ExpReturn,...
ExpCovariance, NumPorts);

BorrowRate    =  0.08;

%portalloc (PortRisk, PortReturn, PortWts, RisklessRate, BorrowRate, RiskAversion);

[RiskyRisk, RiskyReturn, RiskyWts, RiskyFraction, OverallRisk, OverallReturn] = portalloc (PortRisk, PortReturn, PortWts,RiskFreeRate, BorrowRate, RiskAversion);

srsk=RiskyRisk;
sret=RiskyReturn;
prsk=PortRisk;
pret=PortReturn;
Ersk=OverallRisk;
Eret=OverallReturn;

```

%% DisplayResult.m

```
% DisplayResult
% Set up a dataset object that contains the portfolio that maximizes the Sharpe ratio
Blotter = dataset({tickername(RiskyWts > 0)','Name'},{round(100*RiskyWts(RiskyWts > 0),2)','Weight'}, 'obsnames', AssetList(RiskyWts > 0)');
fprintf('== Result =================================================\n');
  fprintf('\n');
  fprintf(' 88   88  88   88888888    8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88888    88      88       8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88   88  88      88       88    88 88    88 88     88      \n');
  fprintf(' 88    88 8888888 88       88888888  888888  888888 888888\n');
  fprintf('\n');
  fprintf('* P o r t f o l i o   A d v i s o r *\n');
  fprintf('\n');
  fprintf(' - ');
try
fprintf('Dear %s,\n');
  fprintf('\n');
  fprintf('',strcat(genderName,name));
catch
end
fprintf(' Given your selected industries, Kowloon Tong Bull has designed\n');
  fprintf(' a Portfolio with Maximum Utility for you:\n');
  fprintf('\n');
  fprintf('');
fprintf(' We suggest that <strong>%d%%</strong> of your wealth should be invested in the\n');
  fprintf(' Hong Kong stock market:\n');
  fprintf('\n');
  fprintf('', round(RiskyFraction*100));
disp(Blotter);
fprintf('\n');
  fprintf(' while <strong>%d%%</strong> should be kept in the risk-less investments\n');
  fprintf('(bank deposits or government bonds).\n');
  fprintf('\n');
  fprintf('', 100-round(RiskyFraction*100));
fprintf('\n');
  fprintf(' Under our suggestion, the performance of your OVERALL\n');
  fprintf(' is as followed:(in annualized term)\n');
  fprintf('');
fprintf('\n');
  fprintf('    RETURN\t\t%.2f%%',Eret*1200);
fprintf('\n');
  fprintf('    RISK(Std Dev)\t%.2f\n');
  fprintf('\n');
  fprintf('',Ersk*12);
fprintf('\n');
  fprintf('Press enter to view detailed portfolio analysis');
pause;



%Ersk=OverallRisk;
%Eret=OverallReturn;

```

%% DrawFrontier.m

```
%DrawFrontierFigure
clf;
plot([crsk,srsk]*1200, [cret,sret]*1200,'g',prsk*1200,pret*1200,'b',srsk*1200,sret*1200,'xr',Ersk*1200,Eret*1200,'+k','LineWidth',2,'MarkerSize',10);
xlabel('% Standard Deviation of Returns (Annualized)');
ylabel('% Mean of Returns (Annualized)');
grid on
print -dpng CapitalAllocation

pause
close

```

%% DrawPieChart.m

```
tNumber=AssetList(RiskyWts > 0)';
tName=tickername(RiskyWts > 0)';
weights=100*RiskyWts(RiskyWts > 0);


```

```
x=[weights];
figure;
h = pie3(x,1+zeros(1,length(x)),tNumber);
labels = tName;
legend(labels,'Location','eastoutside','Orientation','vertical')

pause;
close

```

%% DrawTrendLine.m

```
function DrawTrendLine( expret,stddev )
%DrawTrendLine Summary of this function goes here
%   Detailed explanation goes here

hiret=expret+stddev;
loret=expret-stddev;

now=years(0);
endpoint=years(1);

plot([now,endpoint],[0,hiret],'g->',[now,endpoint],[0,expret],'b->',
[now,endpoint],[0,loret],'r->','LineWidth',2,'MarkerSize',5)
hold on

title('Trend Line & Possibility Distribution');

labels = {'84.1% Possible Lower','Expected Return','84.1% Possible Higher'};
legend(labels,'Location','north','Orientation','vertical','FontSize',12);
ylabel('% Expected Annualized Rate');
pause
close
end

```

%% thankYou.m

```
clc
  fprintf('== Thank You ============================================== \n');
  fprintf('                                                            \n');
  fprintf(' 88   88  88   88888888    8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88888    88      88       8888888  88    88 88     88      \n');
  fprintf(' 88  88   88      88       88    88 88    88 88     88      \n');
  fprintf(' 88   88  88      88       88    88 88    88 88     88      \n');
  fprintf(' 88    88 8888888 88       88888888  888888  888888 888888  \n');
  fprintf('                                                            \n');
  fprintf('* P o r t f o l i o   A d v i s o r *                       \n');
  fprintf('                                                            \n');
  fprintf(' + Thanks for your trust with KLT Bull Portfolio Advisor!   \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('    We sincerely wish you best of the luck with your        \n');
  fprintf('     investments!                                           \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('                                                            \n');
  fprintf('Press any key to exit...                                    \n');
  fprintf('                                                            \n');
pause
%clear

```